METHYL IODIDE

Methyl iodide is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 74-88-4 CH_3I

Molecular Formula: CH_3I

Methyl iodide is a colorless liquid which turns brown on exposure to light. It has a sweet ethereal odor. It is soluble in alcohol, carbon tetrachloride, and ether, and partially soluble in water. Methyl iodide is nonflammable (HSDB, 1991; Merck, 1983; Sax, 1989).

Physical Properties of Methyl Iodide

Synonyms: iodomethane

Molecular Weight:	141.94
Boiling Point:	42.5 ºC
Melting Point:	-66.5 ºC
Vapor Density:	4.9 (air = 1)
Density/Specific Gravity:	2.28 at 20/4 ºC (water = 1)
Vapor Pressure:	405.9 mm Hg at 25 ºC
Log Octanol/Water Partition Coefficient:	1.51
Water Solubility:	1,389 mg/L at 25 ºC
Conversion Factor:	1 ppm = 5.81 mg/m^3

(Howard, 1990; HSDB, 1991; Merck, 1983; Sax, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

Methyl iodide is used as a methylating agent, an alkylating agent, in microscopy, as imbedding material for examining diatoms, in testing for pyridine, as a chemical intermediate, and as a fire extinguisher. It has been detected in the exhaust gases of nuclear reactors (HSDB, 1991).

B. Emissions

No emissions of methyl iodide from stationary sources in California were reported, based on data obtained from the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

Methyl iodide occurs naturally in the ocean as a product of marine algae, with an estimated production of 44 million tons per year (HSDB, 1991).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of methyl iodide. However, the United States Environmental Protection Agency (U.S. EPA) has compiled ambient air data from several urban and suburban locations throughout the United States from 1972-85. From these data, the U.S. EPA has calculated a mean ambient air concentration of 0.12 micrograms per cubic meter or 0.02 parts per billion (U.S. EPA, 1993a).

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of methyl iodide was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

In the troposphere, methyl iodide will photolyze and react with the hydroxyl (OH) radical. The calculated half-life and lifetime of methyl iodide due to reaction with the OH radical are about 140 days and 200 days, respectively. Methyl iodide absorbs solar radiation out to 335 nanometers, and photolysis should dominate as a tropospheric loss process, with a lifetime of the order of about one day (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

Methyl iodide emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to methyl iodide are inhalation, ingestion, and dermal contact (Howard, 1990).

Non-Cancer: Exposure to methyl iodide in air may cause skin blistering, severe eye and respiratory tract irritation, and pulmonary edema. Methyl iodide is neurotoxic. Symptoms include nausea, vomiting, vertigo, ataxia, slurred speech, drowsiness, convulsions, and coma. Central nervous system symptoms may last for weeks. Methyl iodide is hepatotoxic and a highly reactive alkylating agent (U.S. EPA, 1994a).

The U.S. EPA has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for methyl iodide (U.S. EPA, 1994a).

No information is available on adverse developmental or reproductive effects in humans or animals from methyl iodide. (U.S. EPA, 1994a).

Cancer: There are no adequate data on the carcinogenicity of methyl iodide in humans. Rats and mice exposed to methyl iodide developed lung tumors. The U.S. EPA has classified methyl iodide as Group C: Possible human carcinogen (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified methyl iodide as Group 3: Not classifiable (IARC, 1987a). The State of California has determined under Proposition 65 that methyl iodide is a carcinogen (CCR, 1996).